

Notice of Allowability

Application No.

09/990,390

Examiner

Fred Ferris

Applicant(s)

SHTRICHMAN, OFER

Art Unit

2128

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 3 October 2005.
2. ☒ The allowed claim(s) is/are 1-27.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date ____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 09252005.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other ____.

Fred Ferris
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DETAILED ACTION

1. *Claims 1-27 have been presented for examination based on applicant's amendment filed 3 October 2005. Claims 1-27 have now been allowed over the prior art of record.*

Response to Arguments

2. *Applicant's arguments submitted 3 October 2005 have been fully considered and are persuasive. The previous 35 USC 101 and 112(1) rejection of claims 1-9 is now withdrawn in view of applicants amendment to the claims. The previous 35 USC 102(b) and 103(a) rejection is now withdrawn in view of applicants amendment to the claims and arguments presented 3 October 2005, and in the personal interview of 26 September 2005 (See: interview summary).*

Allowable Subject Matter

3. *Claims 1-27 are allowed over the prior art of record.*

The following is an examiner's statement of reasons for allowance:

Applicants are disclosing a method, system, and software product for satisfiability (SAT) testing of target system models (Verilog, VHDL) by constraining the search space for computational iterations through the identification and addition of conflict clauses in a set of formulas describing a target system. The conflict clauses of the claimed invention are computed and analyzed using known methods (Marques-Silva, backtrack search

algorithm) and added to a CNF formula as constraints on the search. This has been disclosed in the prior art of record.

While certain elements of the claimed invention are individually disclosed in the prior art, the prior art of record does not disclose the specific method sequence or arrangement of elements as now required by amended independent claims 1, 5, 10, 14, 19, and 23 (See: specification page 20, line 18 to page 23, line 16, Figs. 3 and 4, for example). In particular, the prior art of record does not explicitly disclose the elements for analyzing a first formula to deduce conflict clauses (leading to the conflict) and, identifying the conflict clauses for which the clauses that lead to the respective conflict in the first formula are a subset of the clauses in the second formula, and subsequently analyzing the second formula for identified conflict clauses to determine if the second formula is satisfied as recited in claims 1, 10, and 19, or, the step of identifying the conflict clauses derived in a preceding one of the instances that are also pertinent to the subsequent instance, as recited in independent claims 5, 14, and 23.

The closest prior art uncovered during examination teaches certain limitations of the claimed invention as follows:

- "GRASP – A New Search Algorithm for Satisfiability", Silva: teaches a method for SAT testing of a CNF formula clause database from formulas including clauses, variables and express constraints, and analyzing a given formula for the purpose of deducing conflicts to be included in a clause database and expressing variable assignments that prevent conflicts and determining if the formulas can be satisfied in a single formula. However Silva does not explicitly disclose

identifying the conflict clauses for which the clauses that lead to the respective conflict in a first formula are a subset of the clauses in a second formula as now required by independent claims 1, 10, and 19, or the step of identifying the conflict clauses derived in a preceding one of the instances that are also pertinent to the subsequent instance, as required by independent claims 5, 14, and 23.

- "Symbolic Model Checking using SAT procedures instead of BDD's", Biere:
teaches bounded model checking (BMC) of a model representing a target system by constructing (generating) a propositional formula that is satisfiable and analyzing by BMC for a satisfying assignment of variables corresponding to the model, but again, does not explicitly disclose identifying the conflict clauses for which the clauses that lead to the respective conflict in a first formula are a subset of the clauses in a second formula as now required by independent claims 1, 10, and 19, or the step of identifying the conflict clauses derived in a preceding one of the instances that are also pertinent to the subsequent instance, as required by independent claims 5, 14, and 23.

The features noted above relating to the specific method sequence and arrangement of elements as now recited in the independent claims 1, 5, 10, 14, 19, and 23 renders the claimed invention non-obvious over the prior art of record. Dependent claims 2-4, 6-9, 11-13, 15-18, and 20-22 are deemed allowable as depending from independent claims 1, 5, 10, 14, 19, and 23 respectively.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

4. *Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred Ferris whose telephone number is 571-272-3778 and whose normal working hours are 8:30am to 5:00pm Monday to Friday. Any inquiry of a general nature relating to the status of this application should be directed to the group receptionist whose telephone number is 571-272-3700. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jean Homere can be reached at 571-272-3780. The Official Fax Number is: (703) 872-9306*

Fred Ferris, Patent Examiner
Simulation and Emulation, Art Unit 2128
U.S. Patent and Trademark Office
Randolph Building, Room 5D19
401 Dulany Street
Alexandria, VA 22313
Phone: (571-272-3778)
Fred.Ferris@uspto.gov
October 28, 2005

Fel Ferris
Oct 21 2005